

Unit 9 Transformations Homework 3

Rotations

Unit 9: Transformations
Homework 3: Rotations

**** This is a 2-page document ****

Give each rule for counterclockwise rotations about the origin:

$90^\circ: (x, y) \rightarrow$ _____ $180^\circ: (x, y) \rightarrow$ _____ $270^\circ: (x, y) \rightarrow$ _____

Directions: Graph and label each figure and its image under the given rotation about the origin.

1. Rhombus $ABCD$ with vertices $A(2, 6)$, $B(6, 7)$, $C(5, 3)$, and $D(1, 2)$: 180°

$A'(-2, -6)$
 $B'(-6, -7)$
 $C'(-5, -3)$
 $D'(-1, -2)$

2. Trapezoid $STUV$ with vertices $S(-7, -1)$, $T(-2, -3)$, $U(-2, -5)$, and $V(-7, -7)$: 90° counterclockwise

$S'(\quad, \quad)$
 $T'(\quad, \quad)$
 $U'(\quad, \quad)$
 $V'(\quad, \quad)$

3. Triangle FGH with vertices $F(-7, 8)$, $G(-1, 1)$, and $H(-8, 4)$: 270° counterclockwise

$F'(\quad, \quad)$
 $G'(\quad, \quad)$
 $H'(\quad, \quad)$

4. Square $JKLM$ with vertices $J(1, -3)$, $K(5, 0)$, $L(8, -4)$, and $M(4, -7)$: 90° counterclockwise

$J'(\quad, \quad)$
 $K'(\quad, \quad)$
 $L'(\quad, \quad)$
 $M'(\quad, \quad)$

5. Quadrilateral $WXYZ$ with vertices $W(-6, 7)$, $X(-3, 6)$, $Y(-1, 3)$, and $Z(-7, 1)$: 180°

$W'(\quad, \quad)$
 $X'(\quad, \quad)$
 $Y'(\quad, \quad)$
 $Z'(\quad, \quad)$

6. Rectangle $CDEF$ with vertices $C(-1, 6)$, $D(0, 6)$, $E(6, 5)$, and $F(5, 3)$: 270° counterclockwise

$C'(\quad, \quad)$
 $D'(\quad, \quad)$
 $E'(\quad, \quad)$
 $F'(\quad, \quad)$

Unit 9 Transformations Homework 3: Mastering Rotations

Are you wrestling with Unit 9 Transformations Homework 3, specifically the rotations section?

Feeling lost in a world of degrees and coordinate planes? You're not alone! This comprehensive guide breaks down the complexities of rotations in geometric transformations, providing clear explanations, practical examples, and helpful tips to conquer your homework and master this crucial concept. We'll cover everything from understanding the basics of rotation to tackling more challenging problems, ensuring you're ready to ace that assignment.

Understanding Rotations: The Basics

Before diving into the intricacies of Unit 9 Transformations Homework 3, let's establish a solid foundation. A rotation, in the context of geometric transformations, is a transformation that turns a figure around a fixed point called the center of rotation. This rotation occurs through a specific angle, measured in degrees. The direction of rotation is typically specified as clockwise or counterclockwise.

Key Elements of a Rotation:

Center of Rotation: The point around which the figure rotates. This is often the origin (0,0) but can be any point.

Angle of Rotation: The amount of turn, measured in degrees. A 90° rotation is a quarter turn, 180° is a half turn, and 360° is a full turn (bringing the figure back to its original position).

Direction of Rotation: Clockwise (moving to the right) or counterclockwise (moving to the left). Counterclockwise is the standard convention unless otherwise stated.

Tackling Unit 9 Transformations Homework 3: Rotation Problems

Now let's get into the specifics of those homework problems. Unit 9 Transformations Homework 3 likely presents various scenarios involving rotations. Here's a breakdown of common problem types and strategies to solve them:

1. Rotating Points Around the Origin:

This is often the starting point for understanding rotations. You'll be given the coordinates of a point (x, y) and asked to find the new coordinates after a rotation of a specified angle (e.g., 90° , 180° , 270°) around the origin. Memorizing the rotation rules for these common angles is highly beneficial:

90° counterclockwise: (x, y) becomes (-y, x)

180° counterclockwise: (x, y) becomes (-x, -y)

270° counterclockwise: (x, y) becomes (y, -x)

For other angles, you'll typically need to use trigonometry (sine and cosine functions).

2. Rotating Figures Around the Origin:

This extends the concept of rotating points to entire figures. To rotate a figure, you simply rotate

each of its vertices using the rules outlined above. Then, connect the rotated vertices to form the image of the rotated figure.

3. Rotating Around a Point Other Than the Origin:

This introduces an added layer of complexity. You need to translate the figure so that the center of rotation becomes the origin, perform the rotation, and then translate the figure back to its original position. This requires a methodical approach and careful attention to coordinates.

4. Using Rotation Rules to Solve Problems:

Many problems will test your understanding of rotation rules. You might be given the pre-image and the image after a rotation and asked to determine the center of rotation and the angle of rotation. Careful analysis and drawing diagrams are key here. Look for patterns and symmetrical relationships between the pre-image and the image.

Tips for Success with Unit 9 Transformations Homework 3:

Practice Regularly: Consistent practice is crucial. Work through as many examples as possible.

Draw Diagrams: Visual representation is invaluable in understanding rotations. Draw large, clear diagrams for each problem.

Use Graph Paper: Graph paper provides accuracy and makes plotting points and figures much easier.

Check Your Work: Always double-check your calculations and ensure the rotated figure makes sense in relation to the original.

Seek Help When Needed: Don't hesitate to ask your teacher, classmates, or online resources for clarification if you're stuck.

Conclusion

Mastering rotations in Unit 9 Transformations Homework 3 requires understanding the fundamental principles, practicing problem-solving strategies, and developing a methodical approach. By carefully working through the examples and utilizing the tips provided, you'll gain the confidence and skills needed to not only complete your homework successfully but also to truly grasp the concept of geometric rotations. Remember, practice makes perfect!

FAQs:

1. What if the angle of rotation is not 90° , 180° , or 270° ? For other angles, you will need to use trigonometric functions (sine and cosine) to calculate the new coordinates. Your textbook or teacher

should provide the necessary formulas.

2. How do I determine the center of rotation if it's not given? Look for patterns of symmetry between the pre-image and the image. The midpoint of corresponding segments often helps identify the center of rotation.

3. Can I use a computer program or calculator to help with rotations? Yes, many geometry software programs and graphing calculators can perform rotations. However, understanding the underlying principles remains crucial.

4. What is the difference between clockwise and counterclockwise rotation? Clockwise rotation is turning to the right, while counterclockwise rotation is turning to the left. Counterclockwise is generally the standard direction unless specified otherwise.

5. Are there any online resources that can help me practice rotations? Yes, many websites and educational platforms offer interactive exercises and tutorials on geometric transformations, including rotations. Search for "geometric transformations practice" or "rotations in geometry" to find helpful resources.

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